SECTION 15065 – POLYVINYL CHLORIDE (PVC) GRAVITY SEWER PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

This section includes materials, installation, and testing of PVC gravity sewer pipe (SDR-35 & SDR-26) and fittings

1.2 RELATED SECTIONS AND REFERENCE DOCUMENT

The work of the following Sections and reference document apply to the work of this Section. Other Sections, not referenced below, shall also apply to the extent required for proper performance of this Work.

1. Section 01047 – Connections to Existing Facilities
2. Section 01048 – Special Construction Conditions and Procedures
3. Section 01300 – Record Drawings and Submittals
4. Section 02140 – Dewatering
5. Section 02223 – Trenching, Backfilling and Compacting
6. Section 03460 – Precast Concrete Manholes
7. Section 07100 – Waterproofing
8. Section 09801 – Manhole Lining
9. Section 15000 – General Piping System and Appurtenances
10. City of Oceanside Water, Wastewater, and Recycled Water Design and Construction Manual (Water Utilities Manual)

1.3 DESIGN REQUIREMENTS

A. Sewer pipe shall be furnished in standard 14’ or 20’ lengths unless otherwise detailed or required on the Approved Plans. Random lengths may be furnished but shall not exceed 15% of the total footage.

B. Minimum length of PVC pipe sections used for tie-ins and stub-outs shall be 36”, unless otherwise approved by the AGENCY.

C. All requirements set forth in Section 3 Sewer Systems Design Guidelines and Standard Drawings of the Water Utilities Manual and these standard specifications shall be met.

1.4 SUBMITTALS

A. Submit data in accordance with the standard specifications.

B. The manufacturer of each shipment of pipe shall be required to supply a statement certifying that each lot or load of pipe has been subjected to the tests specified for PVC gravity sewer pipe. Tests shall show that the pipe has been found to meet all the requirements of ASTM D 3034 and F 679, as applicable.

1. All pipe, fittings, and couplings shall be clearly marked with the following information at an interval not to exceed 5 feet:

a. Nominal pipe diameter.
b. PVC cell classification.
c. Company, plant, date of manufacture, and ASTM and SDR designation. Fittings and couplings do not require the SDR designation.
d. Service designation or legend.

C. The bell and spigot configuration for the fittings and couplings shall be compatible with those used for the pipe.

D. Submit manufacturer's catalog data and descriptive literature for high deflection couplings, repair couplings, service saddles, restrained joints, tracer wire, marking tape, and miscellaneous piping materials.

1.5 INSPECTION

A. The AGENCY may inspect materials, productions, and testing at manufacturer's plant. All costs shall be borne by the CONTRACTOR.

1.6 CONNECTIONS TO EXISTING SEWER MAINS (WYES AND 1/8-BENDS ONLY)

A. Lateral connections shall be connected using a standard wye fitting in accordance with the Water Utilities Manual. Service Saddles are not allowed. The CONTRACTOR shall perform all connections to the existing system in accordance with this section and the Water Utilities Manual.

PART 2 - MATERIALS

2.1 PVC PIPE

A. PVC pipe shall be in accordance with the Water Utilities Manual Section 3.6.C and these standard specifications.

B. All PVC solid-wall sewer pipe shall be made of compounds conforming to ASTM D1784 manufactured in accordance with the material requirements of ASTM D3034 (SDR 35 or SDR26) or ASTM F679 (PS 46 or PS115) as specified the Water Utilities Manual, standard specifications, and approved drawings.

C. Pipe lengths for slopes of less than 2 percent (2.0%) shall not exceed 14 feet.

D. Pipe manufacturers shall be Diamond Plastics, North American Pipe Corporation, Vinyltech Corporation, or approved equal. J-M Eagle is not an acceptable manufacturer.

E. The joint gasket shall be reinforced with a steel ring and meet the requirements of ASTM F477. The pipe shall have an integral bell end with a locked-in factory installed gasket and shall meet the requirements of ASTM D3212.

2.2 PVC GASKETED SEWER FITTINGS

Provide PVC gasketed sewer fittings per ASTM F1336 Standard Specifications for Polyvinyl Chloride (PVC) Gasketed Sewer Fittings. Fittings shall be designed for PVC sewer pipe with the equivalent wall thickness of the pipe to be joined. Do not deflect pipe in these couplings. Gasketed sewer fittings shall be manufactured by Harrington Corporation (HARCO) Gasketed Sewer Fittings, or approved equal.

2.3 MARKING TAPE

Marking tape shall be in accordance with the Water Utilities Manual.

2.4 LATERAL CONNECTIONS OR REPAIRS

Lateral connections shall be connected using a standard wye fitting in accordance with the Water Utilities Manual. Service Saddles are not allowed. Lateral materials shall be in accordance with the Oceanside Water Utilities Manual and the standard specifications.

For lateral connections requiring a new wye connected to an existing main up to 12 inches in diameter, couplings shall be Maxadapter as manufactured by Gripper Gasket, or approved equal. For lateral connections requiring a new wye connected to an existing main greater than 12 inches in diameter up to 24 inches in diameter, couplings shall be Strong Back RC 5000 Series couplings as manufactured by Fernco, or approved equal.

Unshielded couplings are not acceptable.

PART 3 - EXECUTION

3.1 DELIVERY AND TEMPORARY STORAGE OF PIPE

A. Limit onsite pipe, fittings, and appurtenances to the quantity of materials that can be installed in one day unless otherwise approved by the AGENCY. Place the pipe, fittings, and appurtenances alongside the trench and secure them from rolling. Support the pipe uniformly on wooden blocks, sandbags, mounds of sand, or other suitable supports. Do not roll or drop the pipe on the ground or allow the pipe to fall from the pipe trailer trucks. Offsite storage of pipe, fittings, and appurtenances will be maintained by the CONTRACTOR, at the CONTRACTOR's expense. Do not stack higher than 4 feet or stack with weight on bells. Avoid scratching the pipe surface. Cover to protect from sunlight. The offsite location shall be approved by the AGENCY.

B. Do not install pipe that is gouged or scratched forming a clear depression.

C. Do not install pipe contaminated with a petroleum product (inside or outside).

D. Do not install any pipe that shows evidence of exposure to sunlight, age, surface deterioration, or other physical damage. The decision of the AGENCY shall be final as to the acceptability of the pipe to be installed.

3.2 HANDLING OF PIPE

Lift pipes with mechanical equipment using wide belt slings or a continuous fiber rope which avoids scratching the pipe. Do not use cable slings or chains. Pipes up to 12 inches in diameter may be lowered by rolling on two ropes controlled by snubbing. Pipes up to 6 inches in diameter can be lifted by hand.

3.3 SANITATION OF PIPE INTERIOR

A. During laying operations, do not place tools, food, clothing, trash, or other materials in the pipe. Keep the interior of the pipe clean as the pipeline construction progresses.

B. When pipe-laying is not in progress, including the noon hour, close the ends of the installed pipe with a plug to deter entry of vermin, children, dirt, storm water, or foreign material.

3.4 PIPE LAYOUT FOR STRAIGHT AND CURVED ALIGNMENTS

A. Use integral bell end pipe for straight alignments.

B. Pipe lengths shorter than 14 feet shall not be used unless specifically authorized by the Engineer.

3.5 INSTALLING PIPE IN TRENCH

A. Excavate trench and provide pipe bedding and backfill material as specified in the standard specifications and in accordance with the Water Utilities Manual.

B. Inspect each pipe and fitting before lowering into the trench. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after installation.

C. Handle pipe in a manner to avoid any damage to the pipe. Do not drag pipe over the ground, drop it onto the ground, or drop objects on it. Do not drop or allow pipe to fall into trenches.

D. Install pipe to line and grade as specified in the standard specifications and in accordance with the Water Utilities Manual. Laying tolerances for the installed pipe shall not vary greater than 0.1-foot horizontally; and, vertical tolerances shall be 1/4-inch or less for slopes two percent (2.0%) or less and ½-inch or less for slopes greater than two percent (2.0%) from the alignment and elevations shown on the Approved Plans.

E. Prepare bedding material to allow pipe to be laid on line and grade so that only minor movement of the pipe is necessary after installation. Remove hard spots that would prevent a uniform thickness of pipe base material (3/4" crushed rock). Before laying each section of the pipe, check the grade and correct any irregularities found. Excavate bell holes as necessary to allow the trench bottom to form a continuous and uniform bearing and support for the barrel of the pipe at every point between bells or fittings.

F. Keep the trench in a dewatered condition during pipe-laying. Removal of water shall be in conformance with the standard specifications.

G. Do not lay pipe in water or on saturated soil or bedding.

H. Do not disturb installed pipe and bedding when using movable trench boxes and shields. Block or anchor pipe as necessary to prevent joint displacement.

I. Correct misalignment, displacement, or otherwise defective pipe by removing, relaying, or replacing pipe.

3.6 ASSEMBLING PIPE JOINTS

A. The spigot and integral bell or coupling shall be dirt free and slide together without displacing the rubber ring gasket. Lay the pipe section with the integral bell facing the direction of laying.

B. Clean the groove of the bell or coupling of all foreign materials. If the gasket groove is dirty or contains debris, carefully remove the gasket and clean the groove. Insert the gasket back into the groove of the bell or coupling prior to installation. Observe the correct direction of the shaped gasket. Feel that the gasket is completely and evenly seated in the groove.

C. Mark the full insertion depth on the spigot end of the pipe. This mark indicates when the pipe is fully inserted into the bell or coupling. Lubricate the exposed gasket surface and the beveled spigot up to the full insertion mark with the lubricant supplied by the pipe manufacturer. For repair couplings, lubricate pipe for the entire distance the coupling will travel on the pipe. If the lubricated pipe end touches dirt, clean the pipe end and reapply lubricant.

D. Insert the spigot into the bell or coupling and force it slowly into position. Do not over insert the spigot into the bell.

E. Check that the rubber ring gasket has not left the groove during assembly by passing a feeler gage around the completed joint.

3.7 RECONNECTING LATERAL CONNECTIONS

A. Where lateral reconnections are required, they shall be made using a standard wye fitting in accordance with the Water Utilities Manual. Service Saddles are not allowed.

3.8 INSTALLING MARKING TAPE

A. After the pipe zone has been backfilled and compacted, place the marking tape on the compacted pipe zone material and center over the pipe. Run tape continuously along the trench and tie ends of tape together.

3.9 GRAVITY SEWER PIPE CLEANING AND TESTING

A. GENERAL: All testing shall be performed after the pipe is installed, completely backfilled, and temporary pavement installed in accordance with the approved plans, but before permanent pavement is completed. All testing shall be from manhole to manhole through the entire length of the new gravity main pipelines. All testing shall be performed by the CONTRACTOR in the presence of the AGENCY.

B. CLEANING: The pipeline shall be completely cleaned with a Wayne Ball by the CONTRACTOR to the satisfaction of the AGENCY. All testing water used shall be removed per the San Diego Regional Water Quality Control Board requirements.

C. DEFELECTION TEST: After the pipeline cleaning has taken place, the pipeline shall be tested for deflection, joint displacement, and other obstructions by a mandrel test. The test shall be performed not less than 30 days after completion of the trench backfill, but prior to permanent resurfacing. The mandrel shall be a rigid, non-adjustable, odd-numbered leg (9 leg minimum) steel cylinder which has been approved by the AGENCY as to design and manufacture. The rigid mandrel shall be a “go no-go” device and have an outside diameter (O.D.) equal to 95 percent (95%) of the inside diameter (I.D.) of the pipe and a length of at least 75 percent (75%) of the inside diameter of the pipe. CONTRACTOR shall pass a 95% mandrel to the satisfaction of the AGENCY.

D. AIR PRESSURE TEST: PVC pipe shall be air pressure tested in accordance with the test procedures outlined in the Standard Specifications for Public Works Construction (Greenbook) Section 306-1.4.4, Amendment 306-1.4.4.1. Air pressure tests shall be conducted after the deflection testing has been satisfactorily completed.

3.10 CCTV INSPECTION

A. New sewer pipelines shall be tested by CCTV inspection in accordance with the Water Utilities Manual and the standard specifications.

B. After all cleaning and testing are satisfactorily completed, closed circuit television (CCTV) inspections shall be performed by the CONTRACTOR.

C. All defects and evidence of reverse slope, or sags over the limits stated in the Water Utilities Manual, in the pipeline alignment revealed by the CCTV shall be repaired to the satisfaction of the AGENCY at the CONTRACTOR’s expense.

A. New sewer pipelines shall be tested by CCTV inspection in accordance with the the Water Utilities Manual and the standard specifications.

3.11 CONENCTION TO EXISTING SEWER SYSTEM

A. After the gravity sewer pipeline has been tested and approved, connection to the existing sewer system at an existing manhole or other structure shall be made as shown on the approved plans and in accordance with the standard specifications. All work shall be performed in the presence of the AGENCY.

B. In order to prevent unauthorized or accidental use of the new sewer before completion and acceptance, the new inlet to the existing tie-in manhole and the outlet of the first new upstream manhole shall be sealed with expandable plugs. Installation of plugs shall be in accordance with the manufacturer's recommendations and as approved by the AGENCY. Plugs shall be removed at the time of final inspection or as directed by the AGENCY.

**** END OF SECTION ****